

being much more granular on the carapace, and also in leg-measurements, the patella and tibia of the fourth being considerably longer than those of first; length from fovea to anterior border exceeding tibia of second leg, the width considerably exceeding tibia of first leg; the palpal organ is bifid at the tip.

A. Thorellii, Cambr. (*loc. cit.* p. 156, pl. viii. fig. 6), from South Africa, is a longer-legged species than *pretoriae*, the carapace being about equal to the fourth tibia and less than its protarsus.

LIII.—*List of the Arachnida and "Myriopoda" obtained in Funafuti by Prof. W. J. Sollas and Mr. Stanley Gardiner, and in Rotuma by Mr. Stanley Gardiner.* By R. I. POCOCC, of the British Museum (Natural History).

THE specimens forming the subject-matter of the following pages were collected by Prof. Sollas and Mr. Gardiner on the expedition sent out under the auspices of the Royal Society and British Association to Funafuti, in the Ellice Archipelago, to investigate the formation of coral atolls in the Pacific. Mr. Hedley was sent from the Australian Museum, Sydney, to join the expedition, and collections of the various forms of life observed in the island were obtained.

Upon their return to England Prof. Sollas and Mr. Gardiner kindly asked me to examine the Myriopod and Arachnid material they had brought back and to publish a list of the species should any forms amongst them prove to be of interest.

Meanwhile the collections obtained by Mr. Hedley were without delay placed for determination in the hands of members of the staff of the Sydney Museum, and reports of the results were issued with startling, if injudicious, rapidity. The bulk of the terrestrial Arthropoda were entrusted to Mr. Rainbow, who quickly prepared a list* of the Coleoptera, Hymenoptera, Lepidoptera, Diptera, Orthoptera, Pseudoneuroptera, Myriapoda (Chilopoda), and all the Arachnida referable to the orders Scorpiones, Chelonethi (Pseudoscorpiones), Acari, and Araneæ. Of the Chilopoda but one species was recorded, namely *Scolopendra platypus*, Brandt,

* *Vide* 'Memoirs of the Australian Museum,' iii., "The Atoll Funafuti &c.," pt. 2, pp. 89-124 (1897).

the species to which the name *morsicans* is applied in this paper. Of the *Arachnida*, on the other hand, no fewer than twenty-five species, represented by eighty-eight specimens, were identified, and of these, fifteen—that is to say, 60 per cent.—were regarded as new.

Prof. Sollas and Mr. Gardiner were less fortunate, for although a larger number of specimens were obtained by them, the number of species amounts only to eight, and all of these, with the single possible exception of *Garypus longidigitatus*, appear to me to be well-known Oriento-Australian forms. In fact the fauna bears exactly the character that one would venture on *à priori* grounds to prophesy for an atoll occupying the position of Funafuti. That a new scorpion should turn up in such a spot is in the highest degree improbable; and when it is seen that Mr. Rainbow's so-called new species is placed in a genus and family to which it obviously does not belong, one's confidence in its novelty is rudely shaken, and an unfavourable reflection is cast upon his determination of some of the other species of *Arachnida*.

No doubt this scorpion, as well as most—possibly all—of the spiders, has been introduced by human agency either within or before historic times. Some of the spiders, however, may have reached the island by that means of distribution known as “ballooning”—that is to say, floating on webs in early life, a habit which is so marked a characteristic of the smaller species. The False Scorpions, too, may have been introduced by man; but the members of this order also have exceptional means of dispersal in connexion with flies, beetles, and other winged insects, to which, as is well known, they habitually cling. So that, although I am not sufficiently well acquainted with the Pseudoscorpion fauna of the Oriental and Australian regions to say whether the species described as *Chelifer longidigitatus* by Rainbow has previously received a name or not, it is permissible to suppose that it will prove not to be peculiar to Funafuti. The same opinion may be held concerning the one and only species of Millipede obtained on the island, except that the species has certainly not been previously described. As for the Centipedes, they are notoriously widely distributed Oriento-Australian species, a remark which also applies to all the spiders that came into my hands for examination.

The fauna of the island of Rotuma, which Mr. Gardiner took the opportunity of visiting, bears much the same stamp as that of Funafuti, except that it appears to be richer in species belonging to types which have perhaps scarcely so wide a range as those obtained in Funafuti.

It is interesting that in both islands a new species of Millipede belonging to widely distributed Oriental genera was obtained.

I.—LIST OF THE SPECIES FROM FUNAFUTI.

Class ARACHNIDA.

SCORPIONES.

(1) *Hormurus australasiæ* (Fabr.).

To the many synonyms of this widely distributed Oriento-Australian species may be added:—

Buthus brevicaudatus, Rainbow, *op. cit.* p. 107, pl. ii. fig. 1.

Evidently abundant, as was to be expected, on the island, Prof. Sollas and Mr. Gardiner obtaining a large number of examples.

PSEUDOSCORPIONES.

(2) *Garypus longidigitatus* (Rainbow).

Chelifer longidigitatus, Rainbow, *loc. cit.* p. 108, pl. ii. fig. 2.

Prof. Sollas obtained in Funafuti a few specimens of False Scorpions, which, though referable to the genus *Garypus*, appear to me to be specifically identical with the species Mr. Rainbow described as *Chelifer longidigitatus*, the figure and description of the latter being just sufficient to show that the form in question does not possess the characters of the family Cheliferidæ, but of the Garypidæ and of the genus *Garypus*.

(3) *Olpium longiventer*, Keyserling.

Prof. Sollas obtained many examples of a species of *Olpium* which appear to be identical with the form described as *longiventer* by Keyserling from Peack Downs in Queensland.

According to Mr. Rainbow, Mr. Hedley collected specimens of *Obisium antipodum* in Funafuti. I venture, however, to suggest that the specimens identified as *O. antipodum* may be conspecific with those here referred to *Olpium longiventer*.

ARANEÆ.

(4) *Araneus theïis* (Walck.).

This species is exceedingly widely distributed over the

Indo- and Austro-Malayan subregions, in the Polynesian Islands, and Australia.

The characters and the extent of their variation in this species have been repeatedly discussed by Thorell since 1877 (see *Ann. Mus. Genova*, x. pp. 390-396, 1877; *op. cit.* xiii. p. 65, 1878; *op. cit.* xvii. pp. 114-116, 1881; *op. cit.* xxviii. p. 151, 1890).

The following "species novæ" described by Mr. Rainbow from Funafuti are, I believe, merely synonyms of *theis*:—*Epeira ventricosa*, p. 110; *longispina*, p. 111; *multispina*, p. 112; *Etheridgei*, p. 114; *festiva*, p. 115; *obscura*, p. 116; *annulipes*, p. 117; *distincta*, p. 118; *Hoggi*, p. 119; *speciosa*, p. 120.

Prof. Sollas and Mr. Gardiner obtained a large number of specimens of this species, including adults and immature of both sexes. The male specimens agree with the male of *multispina* as described by Mr. Rainbow* and with the males of *theis* as described by Dr. Thorell.

(5) *Tetragnatha ponapea*, L. Koch.

Specimens agreeing with the description of this species, which was recorded from Upolu, were collected by Prof. Sollas.

Mr. Rainbow records *T. laqueata* from Funafuti.

(6) *Uloborus geniculatus* (Oliv.).

Several examples (*Sollas*). Also recorded by Rainbow. Cosmopolitan in distribution.

(7) *Heteropoda venatoria* (Linn.).

Many specimens (*Sollas and Gardiner*).

This is the species which Mr. Rainbow, following L. Koch, identifies as *Sarotes regius*. Mr. Rainbow also records *Sarotes debilis* of L. Koch from the island; but since no reasons for the identification are given, it is not possible to offer an opinion as to the accuracy of the determination.

(8) *Ascyltus pterygodes* (L. Koch).

A few specimens (*Sollas and Gardiner*).

The two species described by Mr. Rainbow as *Hyllus ferox* and *audax* (p. 112, pl. v. fig. 3, and p. 124, fig. 4) appear to

* Pl. iii. fig. 4a does not illustrate the lower side of the trochanter of this spider, as stated, but the lower side of the tibia.

be referable to this form recorded by Koch from Upolu and Tonga.

Mr. Rainbow also records:—*Araneus plebeius*, *Dictis striatipes*, *Clubiona alveolata*, and *Acompse suavis*.

Class CHILOPODA (CENTIPEDES).

(1) *Scolopendra morsicans* *, Linn.

Obtained by Mr. Gardiner. Also recorded by Mr. Rainbow.

(2) *Otostigmus astenon* (Kohlrusch).

Obtained by Prof. Sollas and Mr. Gardiner.

(3) *Mecistocephalus punctifrons*, Newp.

Obtained by Mr. Gardiner.

(4) *Orphnæus phosphoreus* (Linn.).

Obtained by Prof. Sollas.

Class DIPLOPODA (MILLIPEDES).

IULOIDEA.

(1) *Trichocambala Sollasii*, sp. n.

Colour of body a uniform dullish brown above, yellowish below; a conspicuous black spot marking the position of the pores and a conspicuous reddish spot a little distance above the base of the legs; legs yellowish red; antennæ and head pale.

Segments smooth, shining; the transverse sulcus strong and continued over the dorsum as a distinct groove; the pores situated near the middle of the posterior part of the segment, which is longitudinally grooved infero-laterally; the striæ on the anterior segments extend nearly up to the pore; the setæ appear to be arranged in two transverse rows on the posterior part of the segments, one row just behind the sulcus, the other just in front of the posterior margin; the sterna are not striate.

Length 14, width .8 millim.

Number of segments 46.

* Usually spelt *morsitans*, but Linné uses *morsicans* in the 10th ed. of the Syst. Nat.

A single female example was obtained by Prof. Solla.

The only other species of this genus, namely *T. elongata*, was described from Sumatra by Silvestri. The description of *elongata* applies to *Sollasi* except so far as colour and size are concerned, *T. elongata* being described as rufo-ferruginous, with pale antennæ and legs, and as being 28 millim. in length. Thus, whatever may be the value of the colour-differences, there can be no doubt that *elongata* is, at all events, twice the size of *Sollasi*.

II.—LIST OF THE SPECIES TAKEN IN ROTUMA.

Class ARACHNIDA.

SCORPIONES (SCORPIONS).

(1) *Hormurus australasicæ* (Fabr.).

Ranging from Burma to Australia.

(2) *Isometrus europæus* (L.) (= *maculatus*, auct.).

Cosmopolitan.

ARANEÆ (SPIDERS).

(3) *Nephila venosa*, L. Koch (= *prolixa*, L. Koch).

This species was recorded by Koch from the Tonga, Fiji, and Samoa Islands, and also from Rockhampton, Brisbane, Port Mackay, and by Thorell from Cape York.

4. *Araneus (Cyrtophora) molluccensis* (Dol.).

Ranging at least from Ceylon to the Australian islands.

(5) *Araneus theï*s (Walck.).

Widely distributed in the Oriental and Australian regions.

(6) *Heteropoda venatoria* (L.).

Cosmopolitan.

(7) *Plexippus Paykulli* (Aud.).

Cosmopolitan.

(8) *Plexippus foliatus* (L. Koch).

Recorded by Koch from Upolu, Huahine, Tahiti, &c.

(9) *Erasmia nigrovittata*, L. Koch.

Recorded by Koch from the Tonga Islands.

Mr. Gardiner also obtained in Rotuma a few small spiders belonging to the families Pholcidae and Theridiidae, but I am not sufficiently well acquainted with the smaller representatives of these groups to assign names to them.

Class CHILOPODA (CENTIPEDES).

(1) *Ethmostigmus* * *platycephalus* (Newp.).

Recorded from New Guinea, Tahiti, Halmahera, &c.

(2) *Otostigmus astenon* (Kohl.).

Apparently ranging from the Philippines to the Tonga Islands.

(3) *Scolopendra morsicans*, Linn.

Cosmopolitan.

(4) *Mecistocephalus castaneiceps*, Haase.

Previously known from Christmas Island, Pulo Edam off the north coast of Java, and the Andamans.

Class DIPLOPODA (MILLIPEDES).

IULOIDEA.

(1) *Trigoniulus Goësi* (Porat).

Cosmopolitan. Carried everywhere by human agency.

POLYDESMOIDEA.

Family Strongylosomatidae.

(2) *Orthomorpha coarctata* (Sauss.).

Cosmopolitan. Carried by human agency.

* New name for *Heterostoma*, Newp. 1844, preoccupied by Hartmann in 1843, and *Dacetum*, C. Koch, 1847, preoccupied as *Daceton* by Perty, 1830.

Family *Cylindrodesmidæ*, nom. nov.(=*Haplosomidæ*, Silvestri; *Haplodesmidæ*, Cook.)Genus *CYLINDRODESMUS*, Poc.*Cylindrodesmus*, Pocock, Proc. Zool. Soc. 1888, pp. 558-560.*Haplosoma*, Verhoeff, Zool. Anzeiger, xvii. p. 8, 1894 (nom. præocc.).*Haplodesmus*, Cook, Ann. New York Acad. ix. p. 4.

A re-examination of the type species of *Cylindrodesmus*, namely *hirsutus*, from Christmas Island, has failed to reveal to me any satisfactory character by which this genus can be distinguished from the later-described form *Haplodesmus*, Cook (= *Haplosoma*, Verh.). An apparent discrepancy lies, it is true, in the fact that Verhoeff assigns nineteen body-segments to his form, while twenty were, by implication, assigned by me to *Cylindrodesmus*. As a matter of fact, the adult male of the latter has nineteen segments and the adult female twenty and thirty-one pairs of legs. But the female of Herr Verhoeff's species is said to resemble the male in this character. I venture to think, however, that the presence of nineteen segments in the female of *Strubelli*, the type of *Haplodesmus*, is due to the immaturity of the specimens examined, an opinion which is borne out by the opening words of Verhoeff's specific diagnosis:—"Körper der Männchen hellbraun, der Weibchen weisslich."

In the specimens of the two species that I have examined the adult female is the same pale brown tint as the adult male, while the immature female is much paler.

It may be added that, both in the figure and description of *hirsutus*, the prominence of the labrum is exaggerated.

The cuticle of *hirsutus* is thickly covered with short hairs, amongst which are scattered here and there long bristles or short cylindrical blunt-tipped bristles, apparently representing the basal segment of the longer setæ, which persist especially along the hinder border of the segments or at the sides, where there is protection from rubbing. The sternal surfaces are coxiform, being deeply grooved transversely and longitudinally.

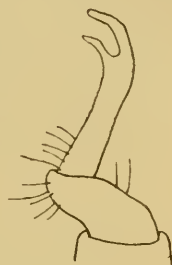
In the legs the trochanters ("femora," Verhoeff) are about twice the length of the coxæ and about two thirds the length of the femora ("tibiæ," Verhoeff); the patellæ and tibiæ are very short and subequal, taken together shorter than the femur; the tarsus is the longest segment, being longer than the femur; the proportion varies, however, a little in different parts of the body. The anal sternite has two prominent angular tubercles, from each of which a long bristle emerges.

In the female the ventral area of the third segment is raised behind the sternal piece to which the legs are articulated, into a convexly margined plate. In the male the distal segment of the copulatory organ arises on the inner surface of the apex of the basal segment, and is curved inwards to meet its fellow of the opposite side, the two then running forwards closely in contact with each other, the apex being curled ventrally and very slightly bifid.

(3) *Cylindrodesmus villosus*, sp. n.

Colour of adult a pale yellowish brown, the sixth segment of the antennæ infuscate; the forehead darker than the lower part of the head.

The female of this species differs in scarcely anything, so far as I have noticed, from *C. hirsutus*; but the male may be at once recognized from the male of *hirsutus* and of *Strubelli* by the form of the copulatory organ, which ends in two subsimilar ventrally turned branches, of which the proximal is much shorter than the distal.



Length of female up to 5.5 millim.

The males of the three known species may be recognized as follows:—

- a. Apex of copulatory organ simple or very slightly divided; length 7–8 millim.
 - a¹. Apex of the copulatory organ bent ventrally and weakly bifid *hirsutus*, Poc.
(Christmas Island.)
 - b¹. Apex of copulatory organ undivided and bent dorsally *Strubelli* (Verh.).
(Amboina.)
- b. Copulatory organ ending distally in two subsimilar branches directed ventrally; length up to 5½ millim. *villosus*, sp. n.
(Rotuma.)

LIV.—On a new Genus of Salmonoid Fishes from the Altai Mountains. By G. A. BOULENGER, F.R.S.

A SINGLE example of a remarkable Salmonoid from the south side of the Altai Mountains, on Chinese territory, was brought home by Mr. St. George Littledale from his recent expedition, and presented by him to the British Museum. The specimen was unfortunately dried, and reached the